

We claim:

1. A method of visualizing the endoplasmic reticulum of at least one cell comprising the steps of:
  - a) expressing a polypeptide comprising AgNt84 (SEQ ID NO: 1) or metal binding fragments thereof, multimers of AgNt84 or metal binding fragments thereof, or fusion proteins comprising AgNt84 or metal binding fragments thereof, in at least one cell, provided that said polypeptide contains the ER-retention signal peptide HDEL or KDEL;
  - b) fixing said at least one cell;
  - c) contacting said at least one cell with an composition comprising a carrier and a metal ion; and
  - d) visualizing said endoplasmic reticulum.
2. The method according to claim 1, wherein said at least one cell is immunochemically stained with antibodies before or after said fixing step.
3. The method according to claim 1 or 2, wherein said cells are contacted with a composition comprising at least one metal ion and said visualization step is performed via electron microscopy.
4. The use of polypeptides comprising AgNt84, variants of AgNt84, fragments of AgNt84, fusion proteins comprising AgNt84, multimers of AgNt84, or metal binding fragments thereof as a histochemical reagent for specific cells within tissues or to identify subcellular structures or organelles for analysis by Electron Microscopy, Energy Dispersive Spectroscopy (EDS) or Electron Energy Loss Spectroscopy (EELS); said polypeptides containing at least one signal peptide that targets said polypeptides to a tissue, subcellular structure or organelle of interest.
5. An isolated polypeptide comprising:
  - a) the polypeptide of SEQ ID NO: 1;
  - b) a variant polypeptide having at least about 20% to 99.99% identity to the polypeptide of SEQ ID NO: 1 and which has at least one of the biological activities associated with the polypeptide of SEQ ID NO: 1;
  - c) a fragment of a polypeptide or a variant polypeptide, wherein said fragment or variant has substantially the same biologic activity as the polypeptide of SEQ ID NO:1;

- d) a signal peptide comprising the amino acid sequence MGYSKTFLLLGLAFAVVLLISSDVSA (SEQ ID NO:3) or a fragment thereof, optionally fused, in frame, to a heterologous polypeptide sequence;
- e) a polypeptide comprising the amino acid sequence HGHRHVHGHGHGHVHGNGNEHGHGHHHGRGHPGH (SEQ ID NO:4), wherein said polypeptide has the ability to bind metal atoms;
- f) a multimeric polypeptide construct comprising: 1) (SEQ ID NO: 1)<sub>x</sub>; 2) (SEQ ID NO: 4)<sub>x</sub>; 3) [L-(SEQ ID NO:1)]<sub>x</sub>; or 4) [L-(SEQ ID NO:4)]<sub>x</sub>, wherein L is a linker element joined to the polypeptide of SEQ ID NO:1 or 4 and x is an integer from 2 to 100; or
- g) a polypeptide comprising [(SEQ ID NO:3)-L]<sub>x</sub>-Y, wherein x is an integer between 1 and 10, L is a linker element and Y is a heterologous polypeptide sequence;

6. An isolated, recombinant or purified polynucleotide sequence comprising:

- a) a polynucleotide sequence encoding a polypeptide sequence selected from the group consisting of SEQ ID NO: 1, 3, and 4;
- b) a polynucleotide sequence having at least about 20% to 99.99% identity to a polynucleotide sequence encoding a polypeptide sequence selected from the group consisting of SEQ ID NO: 1, 3, and 4, wherein said polynucleotide encodes a polypeptide having at least one of the biological activities or the polypeptides comprising SEQ ID NO: 1, 3, or 4;
- c) a polynucleotide sequence encoding a biologically active fragment of a polypeptide selected from the group consisting of SEQ ID NO: 1, 3, and 4, wherein said biologically active fragment has at least one of the biological activities of the polypeptides comprising SEQ ID NO: 1, 3, or 4;
- d) a polynucleotide sequence comprising SEQ ID NO: 2;

- e) a polynucleotide sequence having at least about 20% to 99.99% identity to the polynucleotide sequence of SEQ ID NO: 2;
  - f) a polynucleotide sequence encoding variant of a polypeptide selected from the group consisting of SEQ ID NOs: 1, 3, and 4, wherein said variant has at least one of the biological activities associated with the polypeptides of SEQ ID NOs: 1, 3, or 4;
  - g) a polynucleotide sequence encoding a fragment of a variant polypeptide as set forth in (f);
  - h) a polynucleotide sequence encoding multimeric construct;
  - i) a polynucleotide that is complementary to the polynucleotides set forth in (a), (b), (c), (d), (e), (f), (g), or (h);
  - j) a genetic construct comprising a polynucleotide sequence as set forth in (a), (b), (c), (d), (e), (f), (g), (h), or (i);
  - k) a vector comprising a polynucleotide sequence as set forth in (a), (b), (c), (d), (e), (f), (g), (h), or (i); or
  - l) a polynucleotide that hybridizes under low, intermediate or high stringency with a polynucleotide sequence as set forth in (a), (b), (c), (d), (e), (f), (g), (h), or (i).
7. A genetic construct comprising a polynucleotide sequence as set forth in claim 6.
8. A vector comprising a polynucleotide sequence as set forth in claim 6.
9. A host cell comprising a nucleic acid as set forth in claims 6, 7, or 8.
10. A transformed plant cell comprising:
- a) a polynucleotide sequence as set forth in claim 6;
  - b) a genetic construct as set forth in claim 7;
  - c) a vector as set forth in claim 8; or
  - d) a host cell as set forth in claim 9.

11. A transformed plant comprising:

- a) a polynucleotide sequence as set forth in claim 6;
- b) a genetic construct as set forth in claim 7;
- c) a vector as set forth in claim 8; or
- d) a host cell as set forth in claim 9.

12. A method for bioremediation or phytoremediation of sites contaminated with metals comprising: a) identifying a site suitable for bioremediation; b) providing microbes, trees, or plants expressing a polypeptide comprising AgNt84 (SEQ ID NO: 1) or metal binding fragments thereof, multimers of AgNt84 or metal binding fragments thereof, or fusion proteins of AgNt84 or metal binding fragments thereof; growing said microbes, trees or plants at said site under conditions that allow for the accumulation of metals that contaminate said site in said microbes, trees, or plants; and, optionally, harvesting said microbes, plants, or said trees to remove the metal contaminants from the site.

13. A method of targeting polypeptides to the cell wall of a plant cell comprising transforming a plant cell with a genetic construct encoding a polypeptide comprising AgNt84 (SEQ ID NO: 1) or fusion proteins of AgNt84 and growing said cell under conditions that allow for the expression of the genetic construct and the translocation of the expressed polypeptide to the cell wall of said cell.

14. An article of manufacture comprising protein chips, protein arrays, microcantilevers, or biosensors, said protein chips, protein arrays, microcantilevers, or biosensors comprising the AgNt84 polypeptide (SEQ ID NO: 1) or metal binding fragments thereof, multimers of AgNt84 or metal binding fragments thereof, or fusion proteins of AgNt84 or metal binding fragments thereof.